Classification of the Natural Communities of North Carolina (4th Approximation)

Working draft as of May 2018

Key to Themes

1. Upland communities: xeric to mesic, not subject to significant flooding or saturation. Generally not on alluvial soils, though rare examples may be on high terraces above current natural flood levels.

2. Forest and woodland communities: Trees dominant in an open or closed canopy, generally with 25% or more tree cover where not recently subject to catastrophic natural or anthropogenic disturbance. (Most sites that have had catastrophic disturbance generally show evidence of having been dominated by trees, but some may require knowledge of past conditions that no longer are obvious).

3. Forests dominated or codominated by red spruce (*Picea rubens*), Fraser fir (*Abies fraseri*), or mountain ash (*Sorbus americana*), occurring in the Mountains at high elevations (generally above 5000 feet, most above 5500 feet). (Examples formerly dominated by Fraser fir and examples that experienced logging and severe fire may remain without tree recovery for decades and be difficult to recognize)..... **Spruce—Fir Forests**

3. Forests and woodlands not dominated by these species, though they may occasionally be present in small numbers.

4. Communities dominated or codominated by longleaf pine (*Pinus palustris*) under natural conditions; of the Coastal Plain or eastern Piedmont; canopies naturally open, patchy woodlands or savannas but may become dense with alteration of fire regimes (a few of the Sand Barrens may have only sparse longleaf pine, and have turkey oak (*Quercus laevis*) dominant).. **Dry Longleaf Pine Communities**

4. Communities not as above; longleaf pine absent or extremely scarce.

5. Coastal Plain forests dominated or codominated by live oak (*Quercus virginiana*) or sand laurel oak *Quercus hemispherica*), along with loblolly pine (*Pinus taeda*). Most also contain wild olive (*Cartrema americana*) or yaupon (*Ilex vomitoria*).

6. Forests occurring on barrier islands, small islands in marshes, or on upland sites within a few miles of the coast..... **Maritime Upland Forests**

6. Forests occurring farther inland, on upland ridges surrounded by floodplain or wetland communities. ..... **Swamp Island Evergreen Forest in Piedmont and Coastal Plain Oak Forests**

5. Forests or woodlands not dominated or codominated by live oak or sand laurel oak, usually completely lacking the above species.

7. Piedmont and Mountain woodlands of xeric sites or extreme site conditions: communities tending toward open canopies because of shallow soil, montmorillonite (shrink-swell clay) hardpan subsoil, sharply convex topography, or steep slopes with southerly aspect; canopies open to sparse under natural fire regimes, but may become dense with long exclusion of fire.

8. Woodlands or open forests on shallow soils associated with granitic flatrock outcrops –nearly flat exfoliated rock surfaces..... **Granitic Flatrock Border Woodland in Granitic Flatrocks)**

8. Communities not as above

9. Woodlands of extreme site conditions, including shallow soil over rock, montmorillonite clay subsoil, unstable shale, or the most xeric steep slopes in the Piedmont; canopy, if present, dominated by oaks or conifers.....**Piedmont and Mountain Glades and Barrens**

9. Less extreme though dry sites in the Mountain region and mountainous areas in the upper Piedmont, dominated or codominated by conifers; often on sharply convex ridges and dry slope aspects at low to medium elevations. ..... **Mountain Dry Coniferous Woodlands**

7. Forests of favorable mesic to dry sites across the state: communities tending toward closed canopies in the absence of fire; more open but with substantial canopy under more natural fire regimes; lacking canopy only in gaps or temporarily after catastrophic disturbance.

10. Forests of the Mountain region; or of mountainous upper Piedmont areas and containing multiple species characteristic of the Mountains and not of the Piedmont (e.g. basswood (*Tilia americana* var. *heterophylla*), sweet birch (*Betula lenta*), yellow birch (*Betula alleghaniensis*), cucumber magnolia (*Magnolia acuminata*), American chestnut (*Castanea dentata*), mountain laurel (*Kalmia latifolia*), flame azalea (*Rhododendron calendulaceum*), buffalo nut (*Pyrularia pubera*), black huckleberry (*Gaylussacia baccata*), bear huckleberry (*Gaylussacia ursina*), Table Mountain pine (*Pinus pungens*), pitch pine (*Pinus rigida*), Carolina hemlock (*Tsuga caroliniana*), Canada hemlock (*Tsuga canadensis*), white pine (*Pinus strobus*)).

11. Mountain and upper Piedmont forests naturally dominated or codominated by conifers

12. Forests dominated by Canada hemlock, alone or codominated by white pine or mesophytic hardwoods

13. Forests codominated by oaks and white pine ..... **Mountain Oak Forests**

13. Forests dominated by Canada hemlock or codominated by it with mesophytic hardwoods .....**Mountain Cove Forests**

12. Forests naturally dominated by Carolina hemlock, white pine, or yellow pines, without appreciable Canada hemlock (These must be distinguished from successional forests and plantations of white pine and other conifers) ..... **Mountain Dry Coniferous Woodlands**

11. Mountain and upper Piedmont forests dominated hardwoods, or sometimes codominated by hardwoods and conifers

14. Forests dominated by oaks (*Quercus* spp.), or rarely hickories (*Carya* spp.); or codominated by oaks with white pine; generally on open slopes or ridges (If mesophytic hardwoods are abundant, communities are on ridges or other exposed topography. Yellow pines may be abundant in transitions to drier communities)..... ..... **Mountain Oak Forests**

14. Forests not dominated by oaks, though red oak (*Quercus rubra*) may codominate and other oaks may be present in smaller amounts.

15. Mesophytic forests of higher elevations: generally above 4000 feet, though varying with latitude and slope aspect; on sheltered or open topography; dominated by yellow birch (*Betula alleghaniensis*), sugar maple (*Acer saccharum*), beech (*Fagus grandifolia*), or buckeye (*Aesculus flava*), occasionally with Canada hemlock codominant, sometimes with other species abundant; species characteristic of lower elevation (e.g., tulip poplar (*Liriodendron tulipifera*), cucumber magnolia (*Magnolia tripetala*), Fraser magnolia (*Magnolia fraseri*), flowering dogwood (*Cornus florida*)) generally absent.....**Northern Hardwood Forests**

15. Mesophytic forests of mid to lower elevations: generally below 4000 feet; on sheltered topography such as coves or lower slopes (though slopes may be concave or convex); communities often but not always with higher species richness; species

characteristic of high elevations generally absent (e.g., yellow birch (*Betula alleghaniensis*), red spruce (*Picea rubens*), witch hobble (*Viburnum lantanoides*))..... .....**Mountain Cove Forests**

10. Forests of the Coastal Plain; central to eastern Piedmont; or of the upper Piedmont but lacking most species characteristic of the Mountain region.

16. Forests dominated by oaks (*Quercus* spp.), or rarely hickories (*Carya* spp.); lacking significant presence of beech (*Fagus grandifolia*); yellow pines are often present and may locally codominate; (tulip poplar (*Liriodendron tulipifera*) is abundant only in successional states; red maple (*Acer rubrum*) may be codominant or dominant if oaks have been removed and not regenerated) ..... **Piedmont and Coastal Plain Oak Forests**

16. Mesophytic forests not dominated by oaks: beech (*Fagus grandifolia*), tulip poplar (*Liriodendron tulipifera*), or other mesophytic species generally dominate, though oaks may codominate with these species; rarely a mix of Coastal Plain wetland and upland hardwoods and conifers with few oaks

17. Outcrops of limestone in the Coastal Plain, generally without many trees on the rocks but often shaded by an adjacent mesophytic canopy. ....**Coastal Plain Marl Outcrop**

17. Mesophytic forest not as above, rocky or more often with deep soil

18. Rare forests on calcareous sites (shell middens) near the coast, dominated or codominated by calciphilic species such as sugarberry (*Celtis laevigata*) and Carolina basswood (*Tilia americana* var. *caroliniana*); or rare forests of barrier islands dominated or codominated by deciduous hardwoods such as southern red oak (*Quercus falcata*) and beech (*Fagus grandifolia*). ..... **Maritime Upland Forests**

18. Common Piedmont and Coastal Plain mesophytic forests of sheltered slopes and low-lying mesic upland areas. ..... **Piedmont and Coastal Plain Mesic Forests**

2. Shrub, herbaceous, or sparse vegetation: Trees, if present, generally having less than 25% cover over the whole community, even in the absence of recent catastrophic natural or anthropogenic disturbance. Community aspect is open, without the impression of a tree canopy, though local patches of trees may exist.

19. Rock outcrop communities: bare or lichen-covered bedrock or talus covers the majority of the area of the community; vegetation is patchy and confined to soil mats or pockets or edges; vegetation generally is heterogeneous in structure.

20. Rock outcrop communities of high elevations, generally above 3000-3500 feet; flora indicative of high elevation present (e.g. *Bryodesma (Selaginella*) *tortipilum*, *Sibbaldiopsis tridentata, Trichophorum caespitosum, Carex brunnescens, Geum radiatum, Liatris helleri, Solidago spithamaea, Houstonia montana, Menziesia pilosa, Abies fraseri, Picea rubens*, and *Sorbus americana*).....**High Elevation Rock Outcrops**

20. Rock outcrop communities of the Piedmont, lower elevation Mountains, and rarely Coastal Plain; high elevation species lacking

21. Outcrops of limestone in the Coastal Plain; rock bare or moderately vegetated but may be shaded by mesophytic trees rooted in adjacent deeper soil.....**Coastal Plain Marl Outcrop**

21. Other rock outcrop communities of the Piedmont, lower Mountains, or rarely Coastal Plain

22. Outcrops of flat or gently sloping exfoliated granitic rock in the Piedmont (i.e., flatrocks or pavements); vegetation primarily of annual herbs, perennial herbs, shrubs, and trees on thin soil mats over unbroken bedrock; characterized by a distinct flora that include *Diamorpha smallii, Minuartia glabra, Packera tomentosa,* and *Croton willdenowii (= Crotonopsis elliptica*).... **Granitic Flatrocks**

22. Other outcrop communities of the Piedmont, lower Mountains, or rarely Coastal Plain: near-vertical cliffs, craggy outcrops on exposed sites, sloping exfoliated granitic rock (granitic domes), or open talus; sparse vegetation of varying structure rooted in crevices or deeper soil pockets in irregularities of the rock surface, or vegetation mats on thin soil mats over unbroken bedrock . ..... **Low Elevation Cliffs and Rock Outcrops**

19. Communities not rock outcrop communities as above (though often rocky or with shallow soil): more densely vegetated with herbs or shrubs, or sparsely vegetated but with cover not limited by bare rock; if associated with rock outcrops, having shallow soil and at least herbaceous vegetation over most of the area.

23. Maritime communities: on barrier islands and beach areas; shrubland, herbaceous, or sparse vegetation on sand; non-forested because of chronic sea water overwash, heavy salt spray, or young age of substrate.

24. Maritime communities dominated by shrubs (or shrub-size trees) .. **Maritime Upland Forests**

24. Maritime communities dominated by grasses, trailing vines, or sparse vegetation ... **Maritime Grasslands**

23. Non-maritime communities throughout the state: not as above; densely or moderately vegetated

25. High elevation Mountain communities persistently dominated by dense shrubs, grasses, or sedges..... **Grass and Heath Balds**

25. Communities not as above: moderately to densely vegetated; in a variety of environments in all regions

26. Mountain communities dominated by grape vines (*Vitis* sp.) in patches embedded in forest. ..... **Montane Grape Opening in Montane Oak Forests**

26. Communities not as above; not dominated by grapes.

27. Communities of deep sands of relict dunes in the Coastal Plain (inland from the barrier islands); vegetation sparse due to excessive natural soil drainage (must be distinguished from heavily disturbed sandy sites); longleaf pine (*Pinus palustris*) and turkey oak (*Quercus laevis*) predominant; ground cover sparse, dominated by characteristic sand-tolerating species such as wire plant (*Stipulicida setacea*), spiny spikemoss (*Bryodesma acanthonota = Selaginella arenicola*), and reindeer lichens (*Cladonia* spp.). ..... **Sand Barren in Dry Longleaf Pine Forests**

27. Community not as above: vegetation structure a glade (open variable mix of herb, shrub, tree dominance, with bare rock a minority of the area) or barren (open to sparse tree canopy with moderate to dense herbaceous layer); non-forested because of extreme soil conditions, such as shallow soil over rock, montmorillonite clay subsoil, or unstable shale. ... **Piedmont and Mountain Glades and Barrens**

1. Wetland communities: jurisdictional wetlands, floodplains, and estuarine communities; subject to significant soil saturation, standing water, or flooding by river, stream, estuarine, or ocean waters.

28. Floodplain communities: influenced by at least occasional river or stream flooding and generally occurring on alluvial soils or organic soils along drainages; may or may not be jurisdictional wetlands; (some themes with ambiguous flood influence but along drainages are keyed in both places)

29. Floodplain communities of the Piedmont and Mountains.

30. Piedmont and Mountain alluvial communities: occurring along stream or river channels; and containing at least some characteristic alluvial species such as sycamore (*Platanus occidentalis*) or river birch (*Betula nigra*); usually containing a large, distinct alluvial, beaver pond, or bar flora, but sometimes consisting substantially of mesophytic species; species of bogs and seeps absent or scarce; hydrology ranges from rarely flooded to frequently flooded to permanently inundated. .... **Piedmont and Mountain Floodplains**

30. Saturated wetlands; not influenced by river/stream flooding, or vegetation indicating greater influence by long-term saturation

31. Bog flora present at least in numerous pockets in the community (the rest of the community generally mesophytic, without alluvial flora); characteristic bog species include peat moss (*Sphagnum* spp.), a number of sedges (*Carex folliculata, collinsii, trisperma, …*), cranberry (*Vaccinium macrocarpon*), etc. ..... **Mountain Bogs and Fens**

31. Bog flora substantially absent, though more generalist wetland species may be shared (cinnamon fern (*Osmunsastrum cinnamomeum*)) and peat moss may occasionally be present); seepage species not characteristic of bogs present (e.g., spicebush (*Lindera benzoin*), sensitive fern (*Onoclea sensibilis*), netted chain fern (*Steinchisma areolata*), lizard's-tail (*Saururus cernuus*), arrow arum (*Peltandra virginica*))....**Low Elevation Seep in Upland Seepages and Spray Cliffs**

29. Floodplain communities of the Coastal Plain, occurring on alluvial or organic soils in valleys unconfined by bedrock

32. Communities along small drainages sandhills terrain (mostly in the Sandhills region but occasionally elsewhere in the Coastal Plain), with mucky soils kept saturated by seepage; seldom flooded because of rapid infiltration of even heavy rains into the sandy upland soils; characteristic alluvial or floodplain species not present; fire an important influence; vegetation dominated or codominated by pond pine (*Pinus serotina*), Atlantic white cedar (*Chamaecyparis thyoides*), or vegetation a nearly treeless canebrake (dominated by *Arundinaria tecta*).

32. Communities along small to large rivers or streams; usually with clear evidence of brief to long-duration flooding; vegetation containing substantial numbers of alluvial species (e.g. sycamore, river birch, sugarberry (*Celtis laevigata*), green ash (*Fraxinus pennsylvanica*)), bottomland oaks (*Quercus laurifolia, lyrata, michauxii, pagoda*), or swamp species (cypress (*Taxodium* spp.), water tupelo (*Nyssa aquatica*), swamp black gum (*Nyssa biflora*)), or consisting of an open water or marshy impoundment or open bar; if occurring in a seepage-saturated drainage in sandhills terrain, then the canopy dominated by swamp black gum or the community an impoundment.

33. Community subject to tidal flooding, by lunar or wind tides; forest dominated by swamp black gum, cypress, or green ash.....**Tidal Swamp in Freshwater Tidal Wetlands**

33. Community not subject to tidal flooding; intermittently to seasonally flooded by river or stream flow, or semipermanently flooded by impounded waters in a floodplain.....**Coastal Plain Floodplains**

28. Non-floodplain wetlands and estuarine communities: not influenced by river or stream flooding, or that flooding less important than tidal flooding or long-term saturation; vegetation not generally containing alluvial species

34. Estuarine and Tidal communities: subject to daily or frequent flooding by lunar or wind tides, or frequent overwash by salt water

35. Communities subject to frequent flooding by salt or brackish water; flooded by lunar or wind tides, at least at the highest tides; or frequently flooded in storms (some Maritime Grasslands and Maritime Wetlands are less frequently flooded by salt water overwash); vegetation consisting of salt-tolerant species with structure of marsh, open shrubland, or sparse vegetation .....**Estuarine Communities**

35. Communities subject to regular or frequent flooding only by fresh or oligohaline water (though potentially influenced by salt water in major storms); vegetation containing substantial amounts of species intolerant of brackish or salt water (usually dominated by them); vegetation structure usually dense marsh or swamp woodland or forest .....**Freshwater Tidal Wetlands**

34. Other wetlands: hydrology predominantly driven by ponded rainwater, high water table, sheet flow, or seepage, without significant influence by stream or tidal flooding; both alluvial and salt-tolerant species absent or unimportant

36. Wetlands on barrier islands, in dune swales or flats not subject to frequent salt water overwash (though some may be overwashed or flooded during severe storms); vegetation ranging from swamp forests to shrubland to marsh to open water ponds..... **Maritime Wetlands**

36. Wetlands not on barrier islands; in a variety of sites

37. Wetlands in or on the edges of distinct basins that hold standing water seasonally or permanently; vegetation various

38. Wetlands on edges of large to medium size natural lakes; subject to the hydrology of the lake and potentially subject to lake flooding or wave action; vegetation marsh or forest..... ..... **Natural Lake Communities**

38. Wetlands in or on the edges of small ponds or in basins that don't contain permanent standing water; vegetation various

39. Wetlands in small basins that hold water semipermanently or in small to large basins that hold standing water seasonally;

40. Small depression wetlands of the Piedmont and rarely the Mountains; perched wetlands on upland flats or ridge top saddles; generally on montmorillonite or impermeable clay soils; seasonally flooded into at least in the early growing season; vegetation forest to open shrubland, characterized by willow oak (*Quercus phellos*), overcup oak (*Quercus lyrata*), or buttonbush (*Cephalanthus occidentalis*) in the more abundant communities ....**Piedmont and Mountain Upland Pools and Depressions**

40. Small depression wetlands of the Coastal Plain; Carolina bays, limesink depressions, swales in dune fields, rarely relict fluvial features river terraces now above flood levels; flooded seasonally to semipermanently; vegetation forest, shrubland, drawdown meadow, marsh,, or open water.....**Coastal Plain Depression Communities**

39. Wetlands in small to large basins that have high water tables or saturated soils but rarely if ever contain standing water

41. Carolina bays or swales with organic soil surface (Histosols or Spodosols or Inceptisols with an organic surface); vegetation dominated by dense evergreen or Ericaceous shrubs or by pond pine (*Pinus serotina*) ..... **Peatland Pocosins**

41. Limesink depressions or dune swales that do not appear to flood and which contain wiregrass (*Aristida stricta*) .....**Wet Pine Flatwoods (Depression Subtype) in Wet Pine Savannas**

37. Wetlands not in or on the edges of basins, or in basins never hold standing water that influences the vegetation; mostly in the Coastal Plain, rarely in the Piedmont near the Fall Zone

42. Wetlands on wet flats adjacent to Estuarine Communities or Freshwater Tidal Wetlands; not subject to regular or frequent tidal flooding but influenced by sea level and occasionally flooded during major storms; forests or woodlands naturally dominated by loblolly pine (*Pinus taeda*), or dominated by pond pine (*Pinus serotina*) but without characteristic pocosin shrubs and containing wax myrtle (*Morella cerifera*) .....**Estuarine Fringe Pine Forest in Estuarine Communities**

42. Wetlands not as above; if adjacent to estuaries or tidal communities, never subject to flooding from them; more often on poorly drained interstream flats or terraces;

43. Wetlands on mineral soils; naturally subject to frequent fire; vegetation a savanna or woodland naturally dominated by longleaf pine (*Pinus palustris*), occasionally codominant with other species; in natural condition, communities have a dense herbaceous layer dominated by grasses (wiregrass (*Aristida stricta*), dropseed (*Sporobolus pinetorum,*

Sporobolus teretifolius), toothache grass (*Ctenium aromaticum*), little bluestem (*Schizachyrium scoparium*), or occasionally species of similar ecology (examples with long fire exclusion may be invaded by shrubs and other trees, but remnants of longleaf pine or characteristic savanna species indicate past more open conditions); mostly in the Coastal Plain, but including wet longleaf pine vegetation of the Piedmont.....**Wet Pine Savannas**

43. Wetlands on mineral or organic soils; naturally subject to less frequent fire; never containing longleaf pine; forests, woodlands, or shrublands

44. Pocosins: wetlands with organic soils (Histosols or organic-rich Spodosols); vegetation with a dense shrub layer containing fetterbush (*Lyonia lucida*), gallberry hollies (*Ilex glabra, Ilex coriacea*), titi (*Cyrilla racemiflora*), honeycup (*Zenobia pulverulenta*), leatherleaf (*Chamaedaphne calyculata*), cane (*Arundinaria tecta*), and laurel-leaf greenbriar (*Smilax laurifolia*), with or without an open canopy of pond pine (*Pinus serotina*), loblolly bay (*Gordonia lasianthus*), or other evergreen hardwoods; if the canopy contains any deciduous hardwoods, these don't include appreciable swamp black gum (*Nyssa biflora*) and include no oaks (*Quercus* spp.) or sweetgum (*Liquidambar styraciflua*).

45. Pocosins of deep to shallow organic deposits in large peatlands, organic-filled swales, and peat-filled Carolina bays..... **Peatland Pocosins**

45. Pocosin vegetation along drainages in sandhill areas, mostly in the Sandhills region but occasionally in other sandy areas; sites saturated by seepage from adjacent sandhills but without appreciable stream flooding; soils organic-rich mineral soils; vegetation often includes tulip poplar (*Liriodendron tulipifera*) and poison sumac (*Toxicodendron vernix*) which are never present in the above .....**Streamhead Pocosins**

44. Nonalluvial wetlands forests, not pocosins: sites are seasonally to permanently saturated organic or mineral soils (usually finer-textured Ultisols or more mineral-rich Histosols), sometimes with shallow seasonal flooding, with a canopy of swamp black gum, cypress (*Taxodium distichum, Taxodium ascendens*), wetland oaks, or Atlantic white cedar (*Chamaecyparis thyoides*), sometimes with loblolly pine (*Pinus taeda*); some of the above shrubs of pocosins may be present, but are not extremely dense and are not associated with pond pine.

46. Swamp vegetation along drainages in sandhill areas, mostly in the Sandhills region but occasionally in other sandy areas; sites saturated by seepage from adjacent sandhills but without appreciable stream flooding; soils organic-rich mineral soils; vegetation a forest dominated by swamp black gum or Atlantic white cedar

47. Swamp vegetation dominated by Atlantic white cedar ..... **Streamhead Atlantic White Cedar Forest in Streamhead Pocosins**

47. Swamp vegetation dominated by swamp black gum, alone or with other deciduous hardwoods, sometimes with some pines .....**Sandhill Streamhead Swamp**

46. Wetland forest vegetation on poorly drained interstream flats or non-flooded islands surrounded by Tidal Swamp; soils are fine-textured wet Ultisols or more mineral-rich Histosols); forest dominated by wetland oaks, cypress, swamp black gum, or Atlantic white cedar; (in organic soil swamps along wind tidal rivers, lack of tidal flooding and a shift to these communities is indicated by the dominance of more acid-tolerant shrubs that are shared with pocosins) ..... **Coastal Plain Nonalluvial Wetland Forests**